

The Road to ROD

Portland Harbor Superfund Site

February 27-28, 2013



Definitions

- COPCs – Chemicals of Potential Concern
 - May have risk above 10^{-6} or $HQ > 1$
 - PRG developed
- COCs – Chemicals of Concern
 - Subset of COPCs that need response action
- Remedial Action Level (RAL) Chemicals
 - Identified COC likely to drive active remediation
 - Used to define and evaluate alternative footprints
- PRG- Preliminary Remedial Goal
 - Sediment only
 - Based on Human Health and Ecological Risk Assessments
 - Default to background if less than background

Agenda

- Day 1
 - Meeting Objectives
 - Road to ROD
 - Tech Sessions
 - LWG Tasks
 - Schedule Milestones
 - Anti-backsliding/circle backs/parking lot
 - LWG/Agency Workgroups and Tasks
 - Begin Technical Work Session 1 (TWS #1)
- Day 2
 - Complete TWS #1
 - Review Action Items
 - Review LWG Tasks

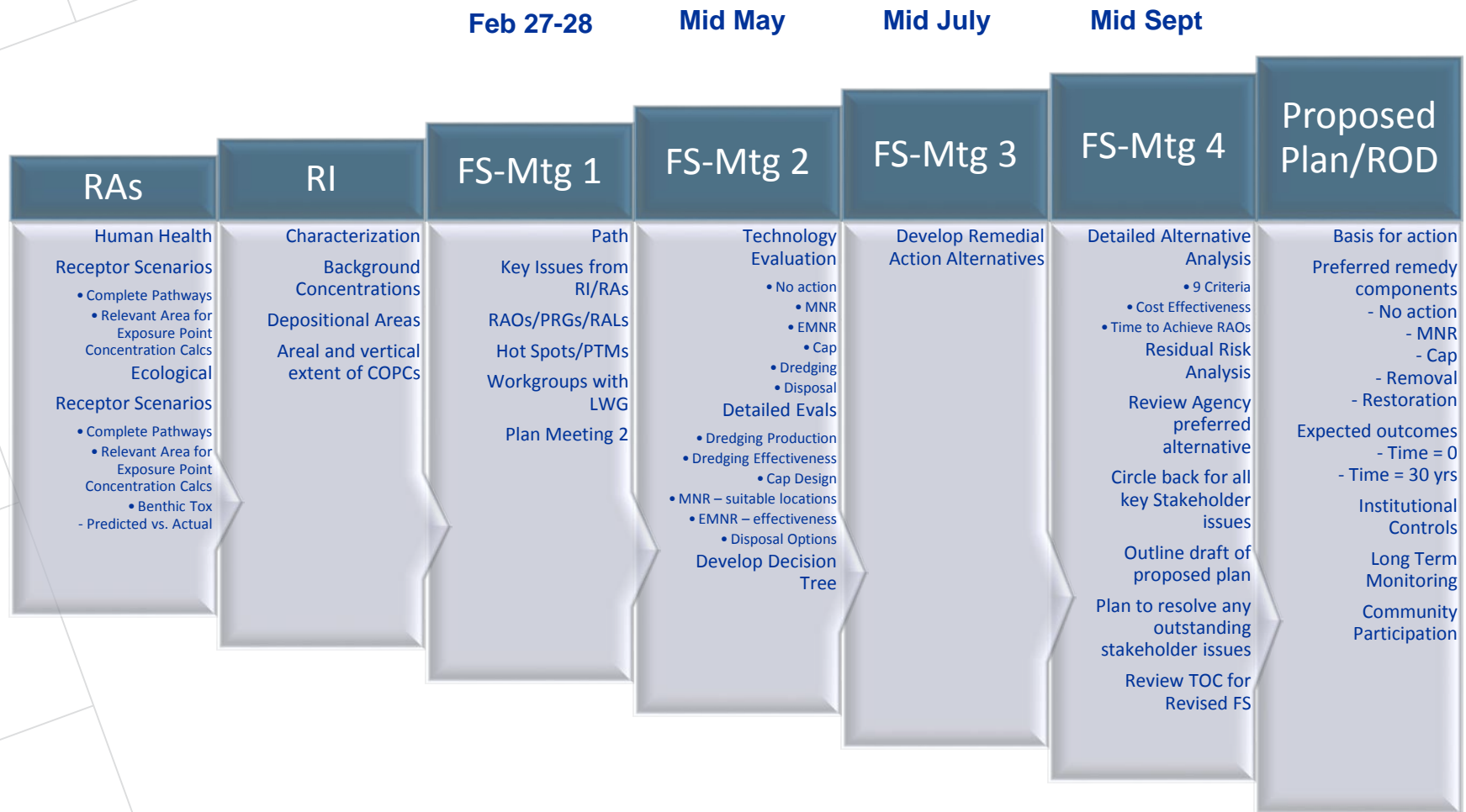


Meeting Objectives

- Day 1
 - Layout path to complete FS in 2013
 - Identify key issues to be resolved from RI and RAs
 - Focus on select COCs
 - Identify additional COCs, PRGs, RALs
- Day 2
 - Review harbor-wide Conceptual Site Model
 - COCs, Surface, Subsurface
 - Site-wide
 - AOPC
 - SMAs
 - Develop tasks for LWG and Agency
 - Define scope and schedule of Technical Work Session #2



Portland Harbor - Road to ROD



Identify key issues to be resolved from RI/RAs

- HHRA
 - COCs
 - Receptors/averaging area
 - PRGs
- EcoRA
 - Benthic Risk Areas (GIS layer from LWG)
 - COCs
 - Receptors/averaging area
 - PRGs
- RI
 - Background



TWS#1 - Desired Outcomes for Day 1

- Finalize key COCs
- Finalize key PRGs relative to background
- Finalize averaging areas to be considered for SWAC roll ups
 - Site-wide
 - 1 mile by side
 - 3 miles by side
 - Point by Point (interpolated)
- Principal Threat Material/Hot Spot (separate meeting?)

TWS #1 – Desired Outcomes for Day 2

- Understanding of distribution of key COCs in harbor:
 - Surface and subsurface
 - East/Nav Channel/Swan Island/Upstream
 - AOPC
- Understanding of key RALs and grouping by alternative
- Understanding of SWACs by RAL for:
 - Site-wide
 - East/Nav Channel/Swan Island
 - AOPC
- Identification of any outstanding issues relative to COC/PRG/RAL/RAO
- Direction/tasks to be requested of LWG
 - Model – criteria to designate area as “depositional” or appropriate for MNR
 - Dredging effectiveness
 - Areas identified for remediation
 - Sequence of operations/dredging with revised fish windows
 - Sub-alternative costs assuming no CDF/CADs

TWS # 1 – Desired Outcomes for Day 2 (cont.)

- TWS# 1 to TWS#2 Assignments
 - Detailed Evaluations
 - Dredging Production
 - Fish window
 - Dredging Effectiveness
 - Cap design/effectiveness
 - Active cap design/effectiveness
 - Meets “treatment” criterion?
 - MNR – suitable locations/effectiveness
 - EMNR – effectiveness
 - Disposal Options
 - CAD/CDF siting and performance standards
 - Develop Decision Tree



RI Issue Review

- Overall site statistics
- Background concentrations
- Depositional areas of river
- Areal and vertical extent of contamination
- AOPC by AOPC look



RI/FS Issues – Overall Site Statistics

- 9.9 river miles (1.9 to 11.8)
- Area – 2100 acres
 - Nav Channel – 1180 acres
 - East Side – 390 acres
 - West Side – 433 acres
 - Swan Island – 128 acres
- AOPCs
 - Total 1037 acres
 - Max – 143 acres – Swan Island (17S)
 - Min – 2 acres – near McCormick and Baxter (15)
- SMAs
 - Alt A – 0 acres
 - Alt B – 125 acres
 - (41-75 acres EMNR)
 - Alt C – 150 acres
 - (40 – 73 acres EMNR)
 - Alt D – 163 acres
 - (37– 68 acres EMNR)
 - Alt E – 237 acres
 - (15 acres EMNR)
 - Alt F – 406 acres
 - (3 acres EMNR)

Previous Caps

- Total of 47 acres
 - McCormick and Baxter – 24 acres
 - Terminal 4 – 19 acres (4 areas 9.9 to 0.1 acres)
 - Gasco Tar Body – 3.1 acres
- Upstream
 - Ross Island 120 acres

Ref: LWG GIS Coverage

Harbor Side Structures – within site

- Total 64 acres of structures
 - Active Docks – 58.5 acres
 - Building/Structures – 3.7 acres
 - Relics < 1 acre
 - Pilings < 0.5 acres
 - Bridge related < 0.5 acres
 - Other < 0.1 acres



RI/FS – Background Concentrations

- Calculated for 36 Chemicals, sums and quotients
- Not calculated for 38
- SVOCs
 - OC-normalized basis for some PAHs, phenols, BEP and hexachlorobenzene
 - Total cPAH , pyrenes (2), anthracenes(2)
- Metals
 - As, Hg, Cd, Se, Sb, Pb, Cu, Zn
- PCBs
 - Total, TEQ, Bz 126, Bz 77
- Dioxin/Furans
 - TEQ & 2,3,4,7,8-PeCDF
- Herbicides/pesticides
 - Dieldrin, aldrin, heptachlor epoxide
 - Sum DDD, DDE, DDT
 - Total Chlordane

FS - Background Concentrations - Metals

Chem Name	Units	Background
Zinc	mg/kg dw	110
Copper	mg/kg dw	37.3
Lead	mg/kg dw	15.4
Arsenic	mg/kg dw	3.97
Antimony	mg/kg dw	0.503
Selenium	mg/kg dw	0.302
Cadmium	mg/kg dw	0.201
Mercury	mg/kg dw	0.0532

FS - Background Concentrations - PAHs

Chem Name	Units	Background
Total cPAH (BaPeq)	mg/kg dw	0.0215
Benzo(b)fluoranthene	mg/kg dw	0.0202
Benzo(a)anthracene	mg/kg dw	0.0159
Benzo(a)pyrene	mg/kg dw	0.0147
Indeno(1,2,3-c,d)pyrene	mg/kg dw	0.0114
Dibenzo(a,h)anthracene	mg/kg dw	0.0032

FS - Background Concentrations – PCBs/Dioxin/Furans

Chem Name	Units	Background
Total PCBs	mg/kg dw	0.017
PCB-077	mg/kg dw	2.52E-05
PCB-126	mg/kg dw	3.92E-06
Total Dioxin TEQ	mg/kg dw	2.16E-06
Total PCB TEQ	mg/kg dw	6.06E-07
2,3,4,7,8- Pentachlorodibenzofuran (PeCDF)	mg/kg dw	5.00E-07



FS - Background Concentrations – Pest/Herb

Chem Name	Units	Background
LWG RA Sum DDE (Calculated U = 1/2)	mg/kg dw	0.00172
LWG RA Sum DDD (Calculated U = 1/2)	mg/kg dw	0.00131
LWG RA Sum DDT (Calculated U = 1/2)	mg/kg dw	0.0011
LWG RA Total Chlordane (Calculated U = 1/2)	mg/kg dw	0.000698
Aldrin	mg/kg dw	0.000339
Dieldrin	mg/kg dw	0.000215

FS - Background Concentrations – OC normalized

Chem Name	Units	Background
Bis(2-ethylhexyl) phthalate	mg/kg-OC	10.1
Benzo(b)fluoranthene	mg/kg-OC	2.53
Benzo(a)anthracene	mg/kg-OC	1.96
Benzo(k)fluoranthene	mg/kg-OC	1.93
Benzo(a)pyrene	mg/kg-OC	1.79
Indeno(1,2,3-c,d)pyrene	mg/kg-OC	1.68
Pentachlorophenol	mg/kg-OC	1.35
Dibenzo(a,h)anthracene	mg/kg-OC	0.795
Hexachlorobenzene	mg/kg-OC	0.125





FS – COCs w/o Background Calcs

- 2-Methylnapthalene
- 4,4'-DDD
- 4-Methylphenol (p-Cresol)
- Acenaphthene
- Acenaphthylene
- Ammonia
- Anthracene
- Aroclor 1254
- Benzo(k)fluoranthene
- Benzyl Alcohol
- beta-Hexachlorocyclohexane (BHC)
- Bis(2-ethylhexyl) phthalate
- Carbazole
- Chromium
- Chrysene
- delta-Hexachlorocyclohexane (BHC)
- Dibenzofuran
- Endrin
- Endrin Ketone
- Fluoranthene
- Fluorene
- gamma-Hexachlorocyclohexane (BHC) (Lindane)
- Hexachlorobenzene
- LWG RA Sum 2,4 DDT, DDE, DDD (Calculated U = 1/2)
- LWG RA Total Endosulfan (Calculated U = 1/2)
- LWG RA Total HPAH (Calculated U = 1/2)
- LWG RA Total LPAH (Calculated U = 1/2)
- LWG RA Total PAH (Calculated U = 1/2)

FS – COCs w/o Background Calcs (cont.)

- Naphthalene
- Nickel
- Pentachlorophenol
- Phenanthrene
- Phenol
- Pyrene
- Silver
- Sulfide
- Tributyltin
- Tributyltin ion



Finalizing COCs and Selecting PRGs

- COC selection
- PRGs relative to background

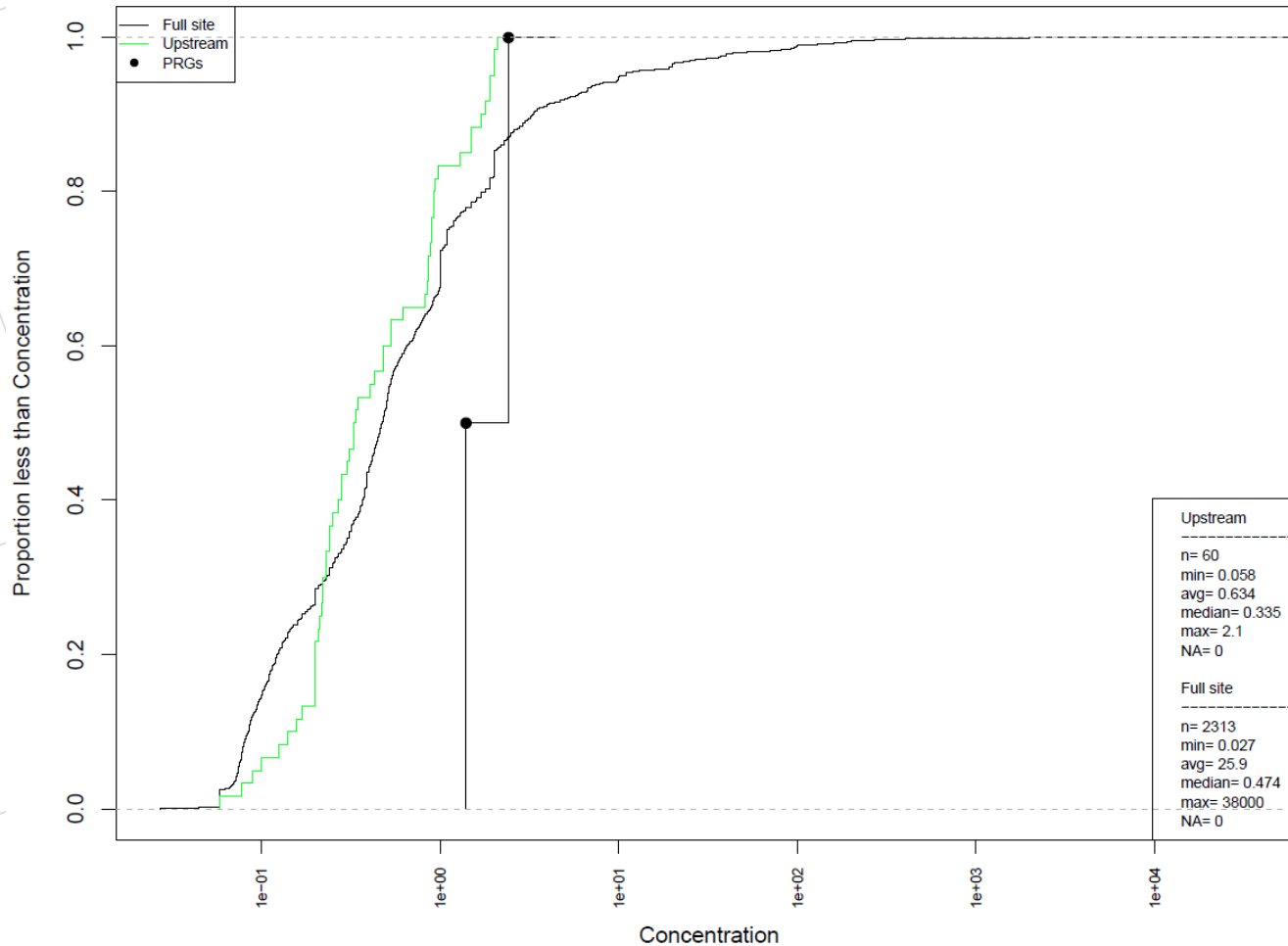


Process to identify COCs, PRGs, RALs

- 1) Is site data different from upstream background ?
- If YES then
- 2) Is site data above lowest, defensible PRG?
- If YES then
- 3) It is a COC - designate it
- 4) Is it co-located with another COC?
- If YES then consider designating one of the COCs as a RAL chemical
- 5) Select RALs and tie to Alternatives
- 6) Map, interpolate, calculate areas, designate source areas, determine replacement value, calculate post-remedy SWAC, residual risk assessment

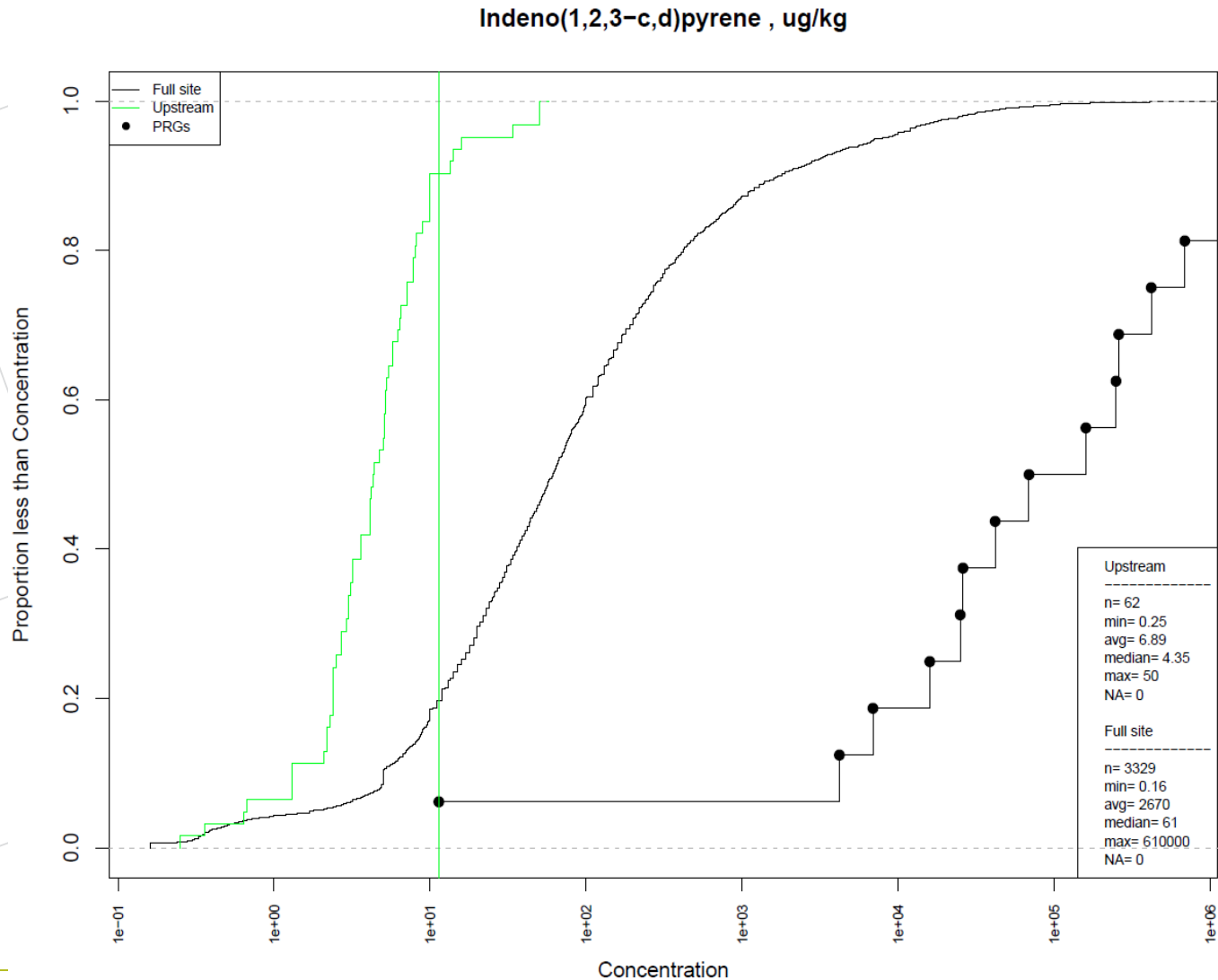
Background vs. non-background

LWG RA Total Endosulfan (Calculated U = 1/2) , ug/kg



- Background

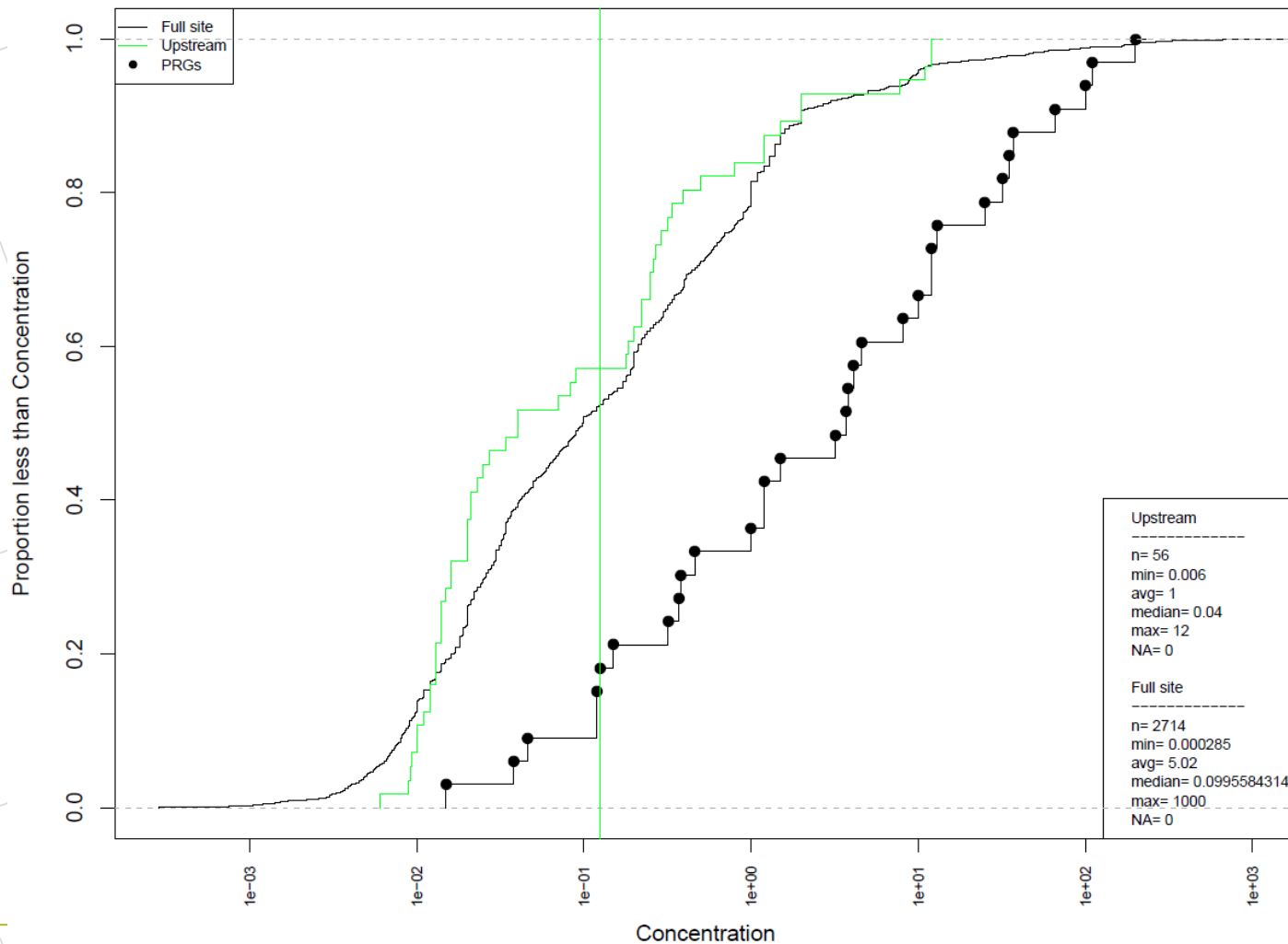
Background vs. non-background



- Non-background

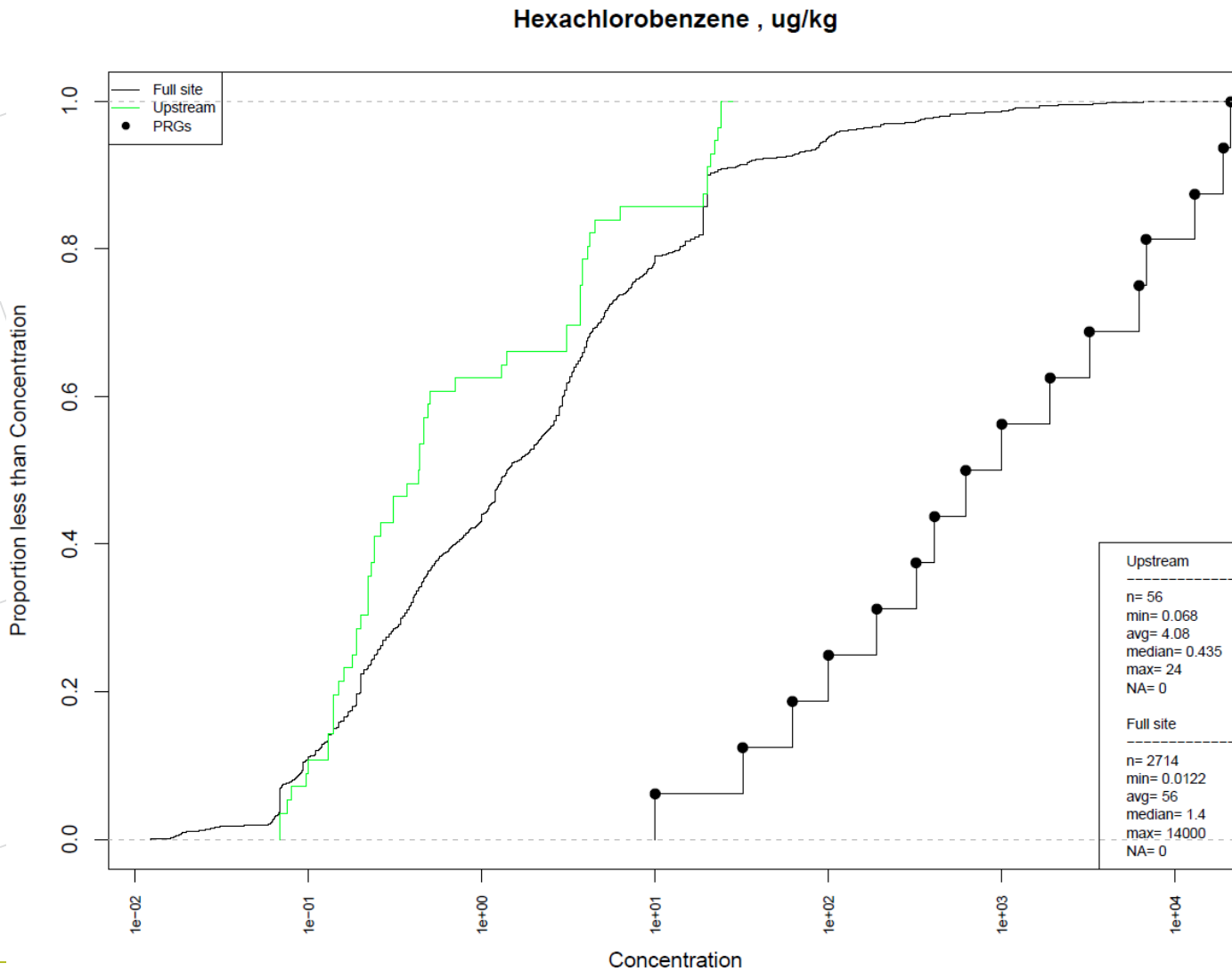
Background vs. non-background

Hexachlorobenzene , mg/kg-OC



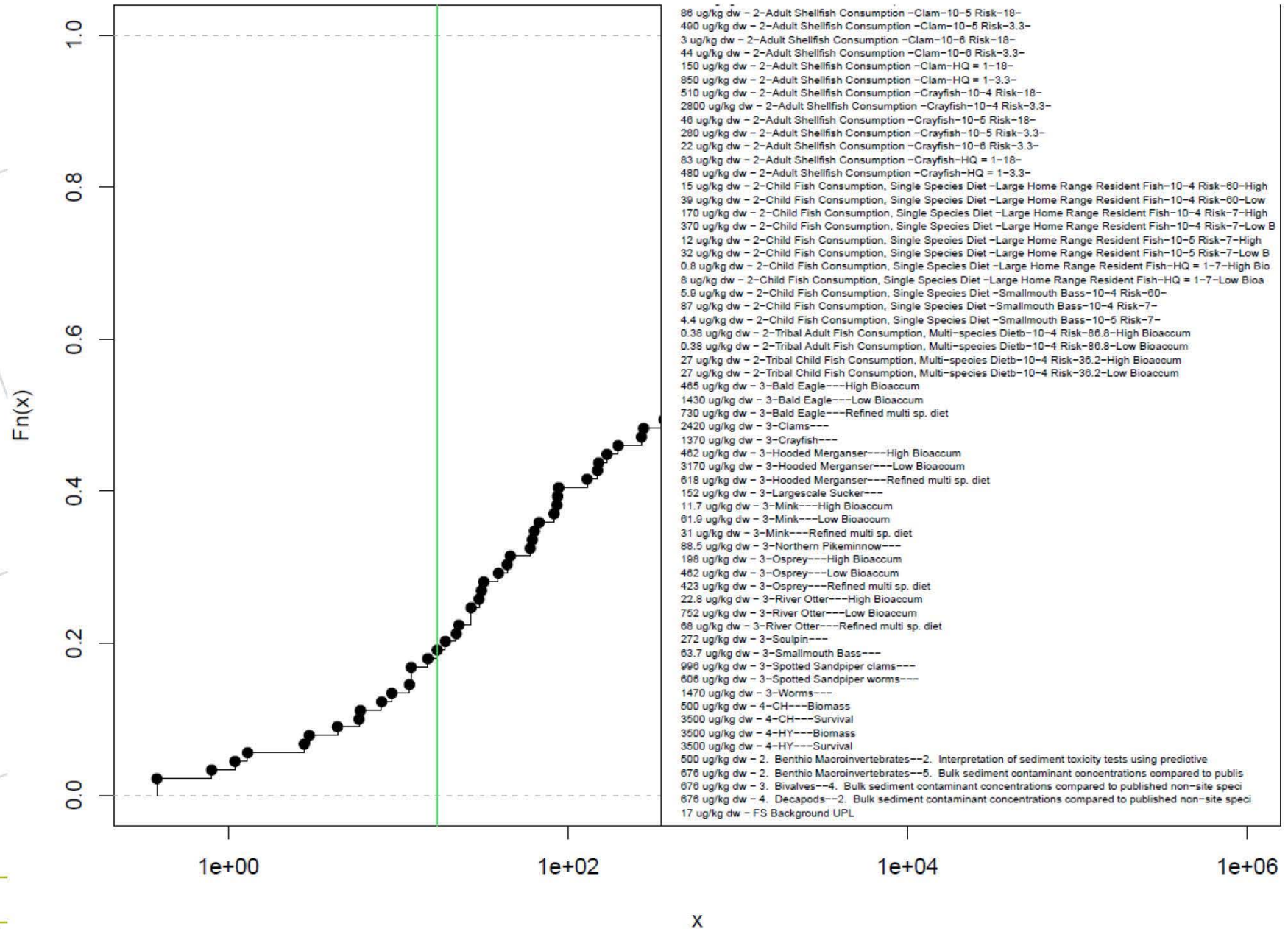
- Background OC normalized

Background vs. non-background

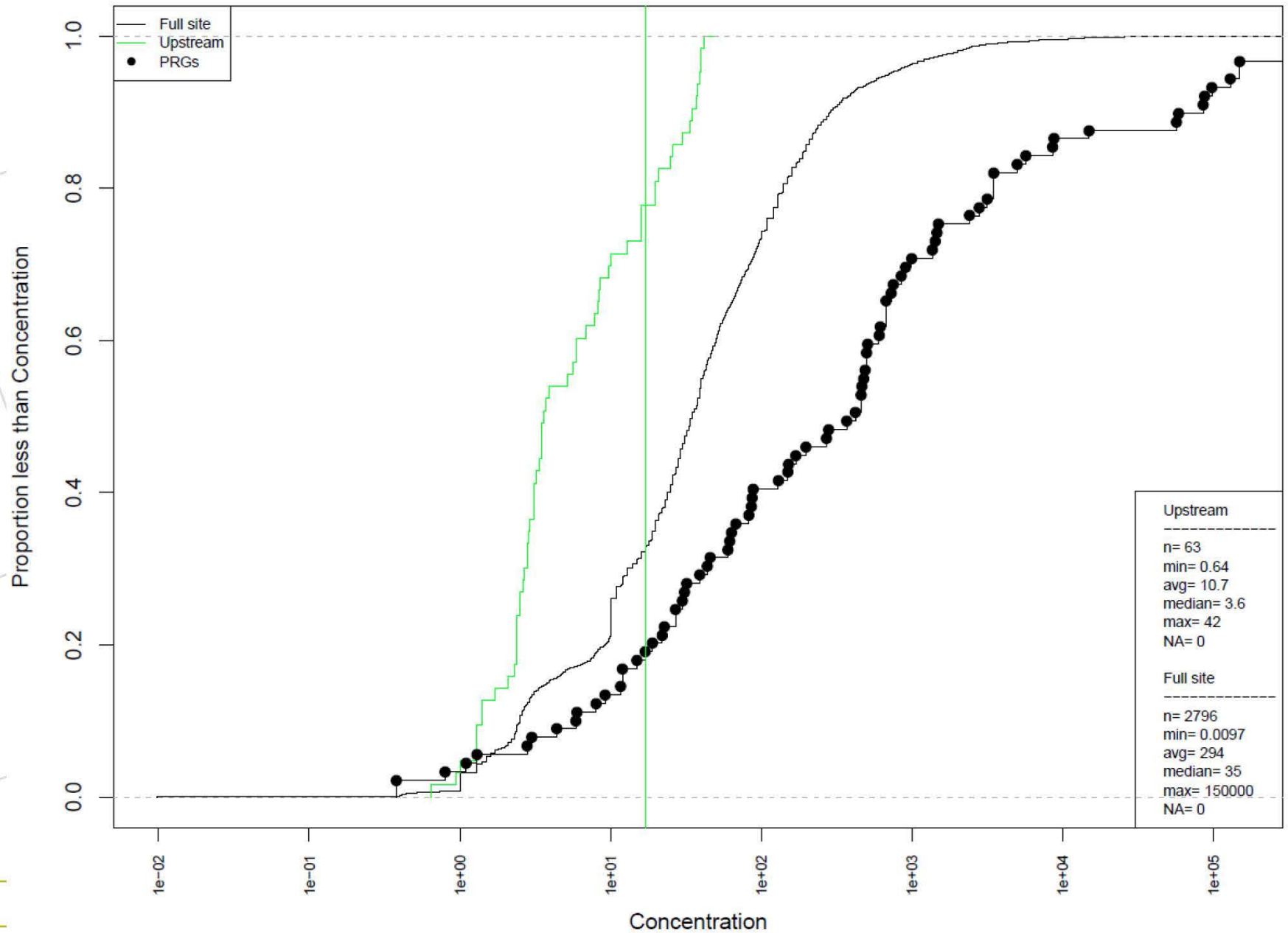


- Background NOT OC normalized

Total PCBs , ug/kg dw



Total PCBs , ug/kg





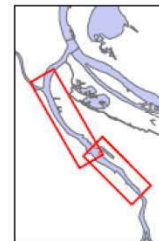
Legend

- AOPCs
- LWG Benthic Toxicity - Alt B
- LWG Benthic Toxicity - Alt C-G

Multiple of Background

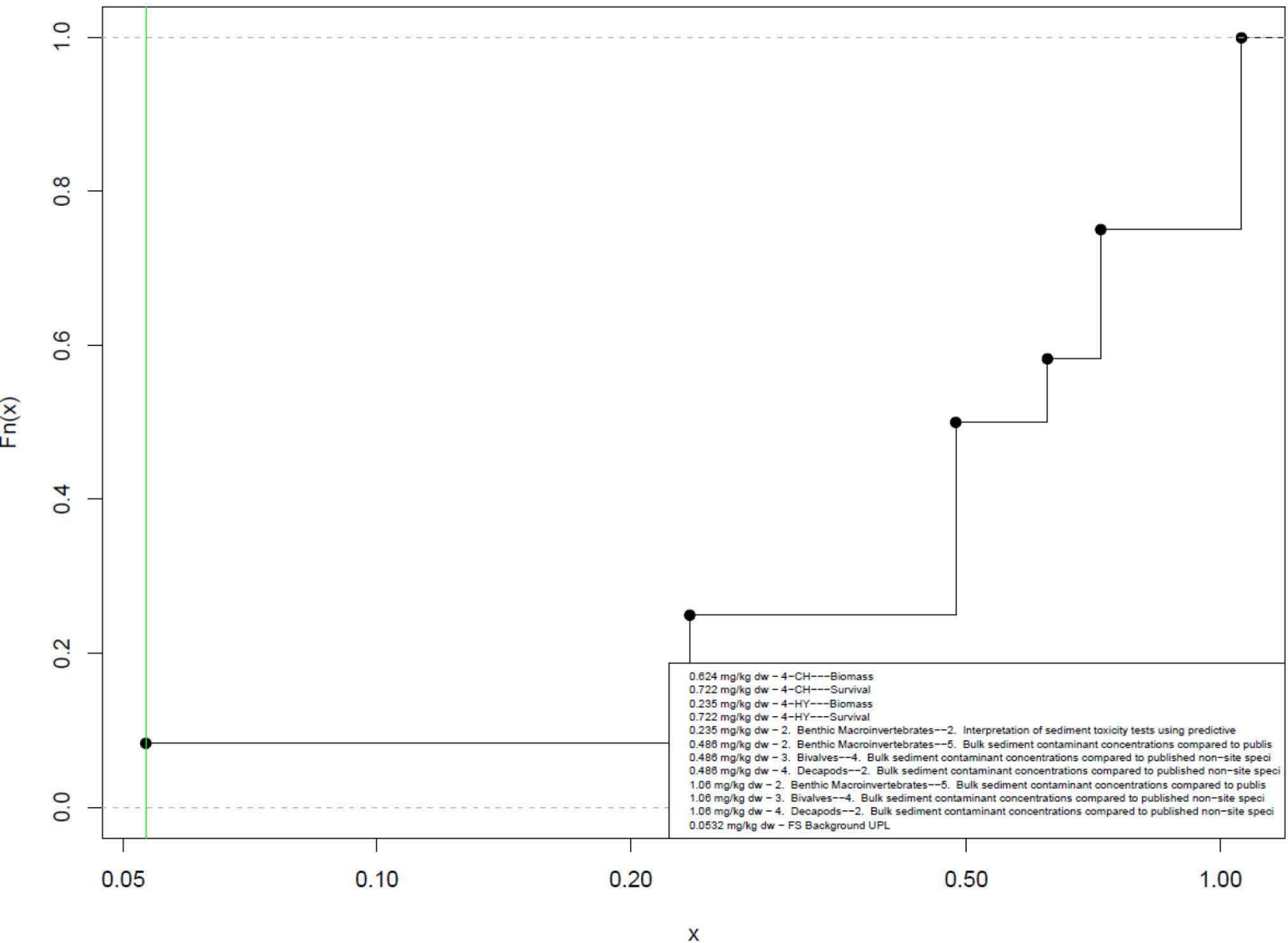
- 0-1
- 1-10
- 10-100
- 100-1,000
- > 1,000

0 1,000 2,000 3,000 4,000
 Feet



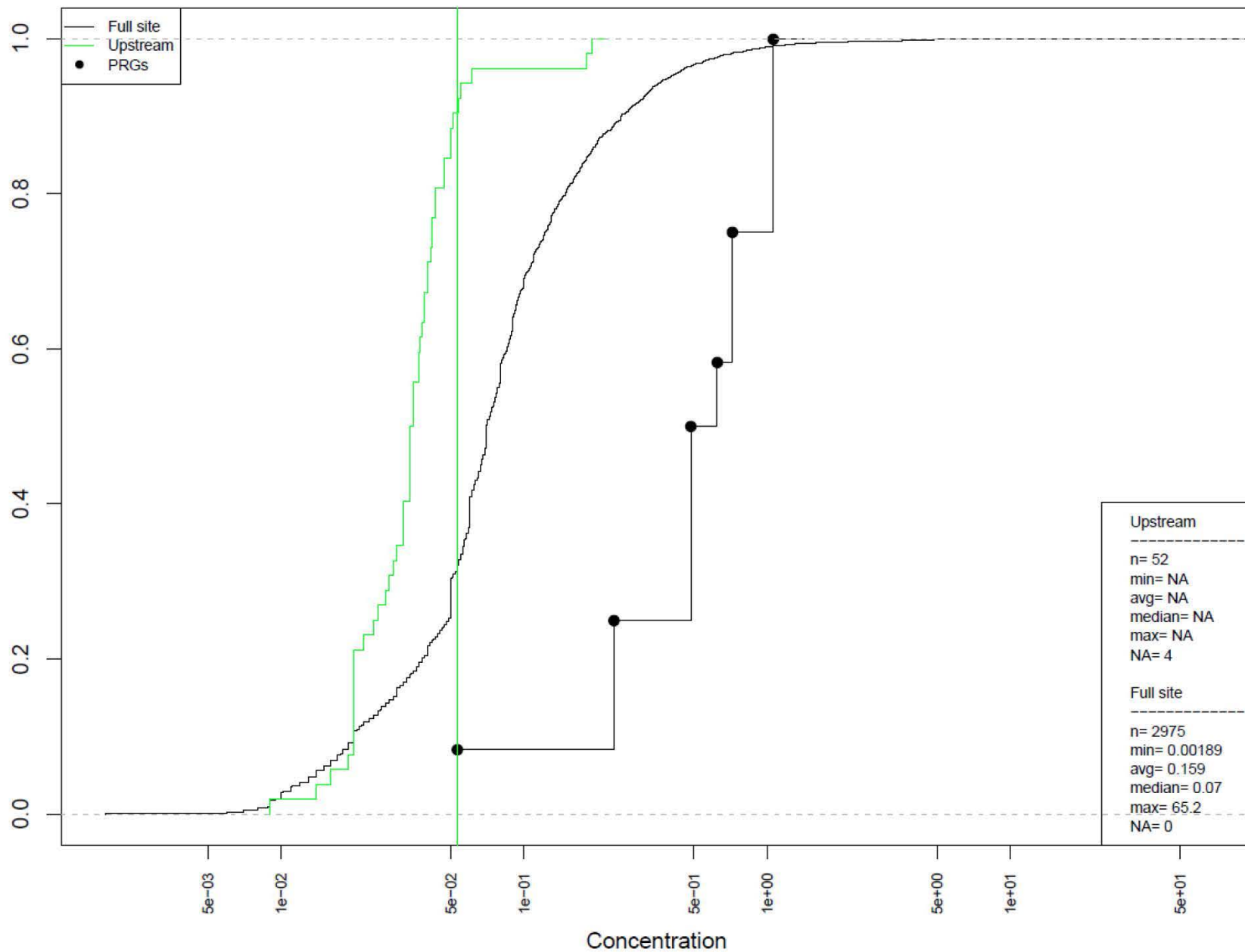
Total PCB in Surface Sediment - Background Normalized
 Total PCB Background Concentration = 17 ug/kg

Mercury , mg/kg dw



Mercury , mg/kg

Proportion less than Concentration





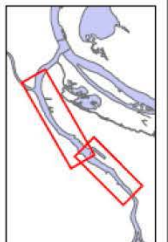
Legend

- AOPCs
- LWG Benthic Toxicity - Alt B
- LWG Benthic Toxicity - Alt C-G

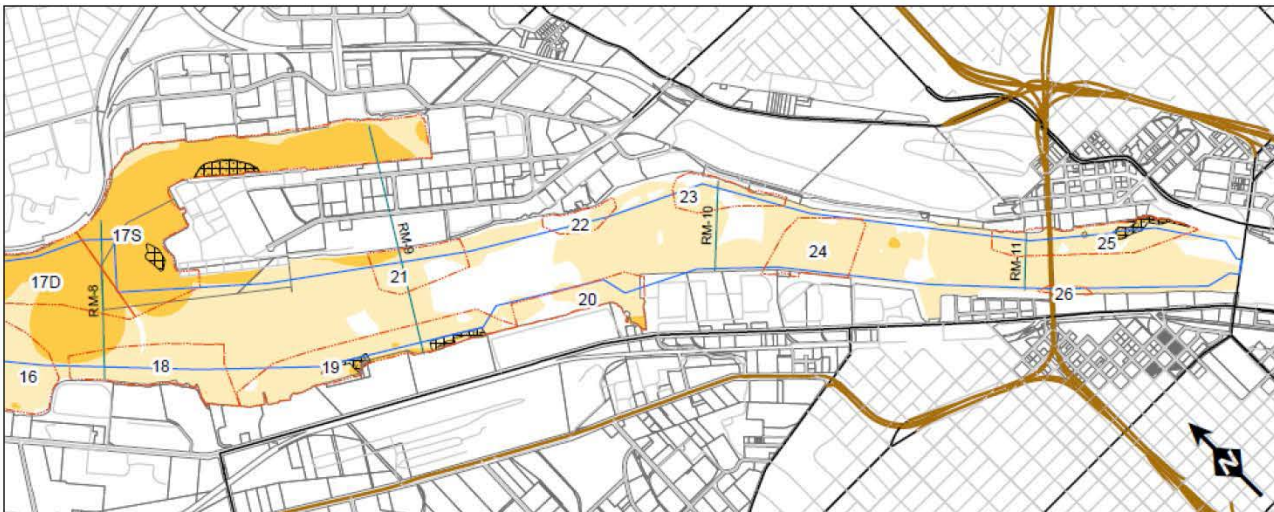
Multiple of Background

- 0-1
- 1-10
- 10-100
- 100-1,000
- > 1,000

0 1,000 2,000 3,000 4,000
 Feet



Mercury in Surface Sediment - Background Normalized
 Mercury Background Concentration = 53.2 ug/kg



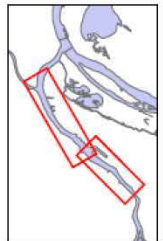
Legend

- AOPCs
- Navigation Channel
- LWG Benthic Toxicity - Alt B
- LWG Benthic Toxicity - Alt C-G

Multiple of Background

- > 10
- > 100

0 1,000 2,000 3,000 4,000
 Feet



Combined Background Normalized - Surface Sediment

COCs - Total PCB, BaPeq, Sum DDD, Sum DDE, Sum DDT, Total DDx, PeCDFuran, Lead, Mercury, TEQ Mammal, Total PAH, Tributyl Tin

Risk Assessments Review

- COCs
- Receptors
- Scenarios
- Averaging areas
 - Point by point
 - 1-mile by side
 - Sitewide
- Benthic tox tests – maps to be revised

FS Review

- RAOs
- PRGs/RGs/RALs
- General Response Actions/Technologies
- Alternatives Development
- Alternatives Analysis/Evaluation/Ranking
 - NCP nine criteria
 - Scoring/weighting scheme
- Selection of preferred remedy



FS Review - RAOs

- “Reduce risks from exposure/ ingestion/ inhalation/ (dermal/direct) contact to acceptable levels and comply with identified ARARs”
- RAOs (1-4 Human, 5-8 Ecological)
 - 1 & 5 – Sediment – ingestion and dermal/direct contact
 - 2 & 6 – Tissue – ingestion of fish and shellfish via bioaccumulation from sediment and/or surface water
 - 3 & 7 - Surface water – ingestion/inhalation/dermal/direct contact/future drinking water
 - 4 & 8 – Groundwater – direct exposure and indirect through fish/shellfish consumption

Areal scale for decision informing

- Receptor based
 - Site Wide
 - East/West/Navigation Channel/Swan Island
 - 1 mile
 - Point by point
- Composite concentration based
 - Based on cumulative footprints of key COCs
- Administratively based
 - AOPC
 - SMA – LWG proposed remedial decision management unit
 - Alternate area (e.g, swim brick)

Day 2

- Review of Day 1 COC Table
 - To be mapped
 - No LWG background
 - Sum of TEQ bkgds
- Mapping of key COCs
- PRG discussion
- RAL discussion
- LWG Tasks
- Agency Tasks
- Action Items
- Next Meeting



COC Mapping Status

- Mapped

- 2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)
- Lead
- LWG RA Total cPAH/BaPEq TEQ (EPA 1993) (Calculated U = 1/2)
- LWG RA Total PAH (Calculated U = 1/2)
- Mercury
- TEQ D/F Mammal (to be replaced by sum TEQ PCB+D/F)
- Total PCBs
- Tributyltin ion (to be re named w/o ion)
- DDx

- To be mapped

- Antimony
- Arsenic
- Bis(2-ethylhexyl) phthalate
- Add: C10-C12 Aliphatic
- Add: C10-C12 Aromatic
- Cadmium
- Chromium
- Copper
- Dieldrin
- gamma-Hexachlorocyclohexane (BHC) (Lindane)
- Hexachlorobenzene
- Total HPAH
- Total LPAH
- LWG RA Total Chlordane (Calculated U = 1/2)
- Add: PBDE
- New:Total TEQ Avian
- New:Total TEQ Fish
- New:Total TEQ Mammal
- Pentachlorophenol
- Zinc

Mapping Exercise

GroupOrTargetChemicalName	Background	PRG HH 10-5	PRG ECO - Low	PTM/ HotSpot Threshold
LWG RA Total cPAH/BaPEq TEQ (EPA 1993) (Calculated U = 1/2)	21.5	20xBkgnd	NA	200xBkgd
LWG RA Total PAH (Calculated U = 1/2)	187	NA	100xBkgd	1000xBkgd
Total PCBs	17	<Bkgd	Bkgd	Near Bkgd
LWG RA Total DDx (Calculated U = 1/2)	3.6	<Bkgd	2xBkgd	Near Bkgd
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.0005	<Bkgd	100xBkgd-	Near Bkgd
New: TEQ-PCB+D/F - Avian,Fish,Mammal	0.00216	200xBkgd	NA	2000xBkd
Mercury	53.2	NA	5xBkgd	50xBkgd
Lead	15.4	NA	2xBkgd	20xBkgd
Tributyltin ion	1	NA	3000xBkgd	30000xBkgd



Missing Background

- Antimony
- Arsenic
- C10-C12 Aliphatic
- C10-C12 Aromatic
- Cadmium
- Chromium
- Copper
- gamma-Hexachlorocyclohexane (BHC) (Lindane)
- New:Total TEQ Avian
- New:Total TEQ Fish
- Zinc



RAIs (ppb) and Statistics

Alt	PCB	cPAH (BaPeq)	DDD (To be eliminate d)	DDE(move to Sum DDT+DDE?)	DDx	DDT+DDE	PeCDF(To be eliminate d)	TotalTEQ
A (site-wide mean/ median)	293 35	5,350 120	971 3.3	45 2.6		2800 2.3	0.063 0.0003	0.07 0.001
B (site-wide percentile)	1000 (96)	20,000 (96)		LWG 1000 EPA 130 (99)	EPA650			
C	750 (95)	15,000 (95)		LWG1000 EPA 110 (99)	EPA550			
D	500 (94)	8,000 (93)		LWG200 EPA 90 (98)	EPA450			
E	200 (86)	4,000 (91)	100 (92)	50 (95)	EPA300	150 (94)	0.02 (94)	
F	75 (68)	1,500 (86)	50 (89)	20 (91)	EPA160	60 (91)	0.01 (91)	
G	50 (60)	600 (78)	15 (79)	10 (85)	EPA40	20 (84)	0.005 (86)	

TWS #1 Conclusions

- Refinements to RAOs? - No
- COCs – In Progress
- RALs – Revised list
- Key Receptors at t=0 and t=30 years – To Be Discussed
- PRGs
 - Some less than background
 - Ecological PRGs complete
- Decision management unit area – min or max acres - TBD
- RGs (at t=0 and t=30 years, at given area) – To be discussed
- Principal threat material (hot spot) designation criterion – To be discussed – map (10-4, 10 Eco or HHRA HI) and review again

Action Items (1)

- PRG calculation
 - HHRA
 - Action: Need FWM from LWG – Chip
 - Calculate PRGs - Elizabeth
 - Eco
 - DDx, TEQ – fish - Burt
- Benthic Tox
 - Agencies to define revisions to Level 2 Tox criteria for 4 endpoints - Burt/Agency BERA Team
 - Task LWG with revised calculation of GIS footprints – Chip/Kristine
- Revise focused COC list, map, look at culling focused COC list – Todd – with follow up phone/webinar



Action Items (2)

- Running averages – Todd
- PTM/Hot Spot
 - Maps - Todd
 - Discussion
- Send COC Excel Table & TWS#1 Powerpoint to all attendees
- RM 1.4 - Hg, PCB other metals?
- Tabled: TZW COCs and how to address – after sediment remediation areas delineated
- MNR: criteria for an area being a candidate? – TWS#2 topic

Technical Work Session #2

- Post TWS1 Follow Up Call
 - Focused COCs
 - Maps
 - Potential additional focused COCs
 - PTM/Hot Spot
- Pre TWS2 Call
- Scope
- Schedule
- Attendees
- Venue



Scope of TWS #2

- Technology Development
 - No action
 - EMNR
 - MNR
 - Active Cap
 - Cap
 - Dredging
 - Disposal
- Criteria for suitability for a given area
- Decision tree for applying remedial technologies
- Technology parameters
 - Area suitability
 - Production/design
 - Area/Volumes/SWAC
- Technology Effectiveness

Assignments for LWG or Agency?

- Sequence of operations/dredging with revised fish windows production rates
 - Meeting with ODFW, USFWS and NOAA-NMFS – Chip/Kristine
 - Bring in experts
 - Karl – Paul Schroeder
 - Susan/Eric – Paul Fuglevand
 - Equipment/sequence/release/control assumptions – Agency sub-team
 - Meet with LWG
 - Sub-alternative costs assuming no CDF/CADs
 - Depositional lines of evidence – Model track
 - criteria to designate area as “depositional” or appropriate for MNR
 - Model runs?
 - Alternative approach to areas identified for remediation
 - Additional COCs, RALs
 - Buried COC considerations
 - Other?



Assignments for LWG (2)

- PRG Calculation for COCs
- Background Calculation for COCs



Agency FS Team Action Items

Item	Description	Lead	Resources Required	Due Date

Future Worksessions

- Receptor Significant Environs
 - Shallow
 - Deep
- Area Use Class
 - Navigation
 - Shallows
 - Beach/bank
 - Under structure
 - Limited Access
- GRA/Technologies
 - No action
 - MNR
 - Cap
 - Removal
- Alternative development

- Alternative comparison
 - At times
 - 0 & 30 yrs
 - Criteria
 - Protective
 - ARARs
 - Implementability
 - Short term impacts
 - Long term effectiveness
 - Reduction in tox/mob/vol through treatment
 - Cost
 - Support Agency Acceptance
 - Community Acceptance
- Criteria weighting & scoring
- FS-Mtg 3
 - Review Agency preferred alternative
 - Circle back for all key Stakeholder issues
 - Outline draft of proposed plan
 - Plan to resolve any outstanding stakeholder issues



- Proposed Plan/ROD
 - Basis for action
 - Preferred remedy components
 - No action
 - MNR
 - Cap
 - Removal
 - Restoration
 - Expected outcomes
 - Time = 0
 - Time = 30 yrs
 - Institutional Controls
 - Long Term Monitoring
 - Community Participation

